Claims:

1. A hyperspectral image calibration pad has at least one surface exterior to the body part with the following optical properties:

a. at least 95% opaque to electromagnetic radiation over a predetermined wavelength range of at least 50 nanometers;

b. has a predetermined reflectance of at least 1 percent to wavelengths of light over said wavelength range;

c. has a reflectance value for at least a first wavelength within said 50 nanometer wavelength range that varies less than 10% over a desirable image region; and

d. has a reflectance value for at least a second wavelength within said 50 nanometer wavelength range that varies less than 10% over a desirable image region.

2. The calibration pad of claim 1 wherein the pad is form fitting to a sample to assume the shape of that sample.

3. The calibration pad of claim 1 wherein the pad conforms to said at least one surface with minimal deformation that would effect imaging.

4. The calibration pad of claim 1 wherein the pad is form fitting to approximate the surface contours of said at least one surface to be imaged.

5. The calibration pad of claim 1 prepared by a process of:

a. bathing the pad in a solution; and

b. packaging the pad from step a.

6. The calibration pad of claim 1 comprising a hydrogel pack.

7. The calibration pad of claim 1 wherein the at least 50 nanometer wavelength range is at least 100 nanometers.

8. The calibration pad of claim 1 wherein the at least 50 nanometer wavelength range is at least 200 nanometers.

9. The calibration pad of claim 1 wherein the at least 50 nanometer wavelength range is at least 400 nanometers.

10. The calibration pad of claim 1 wherein the at least 50 nanometer wavelength range is at least 700 nanometers.

11. The calibration pad of claim 1 wherein the predetermined reflectance is at least 5 percent.

12. The calibration pad of claim 1 wherein the predetermined reflectance is at least 10 percent.

13. The calibration pad of claim 1 wherein the predetermined reflectance is at least 25 percent.

14. The calibration pad of claim 1 wherein the reflectance properties of the exterior surface change as a function of temperature.

15. The calibration pad of claim 1 wherein the reflectance properties of the exterior surface change as a function of humidity.

16. The calibration pad of claim 1 wherein the pad is polarized to electromagnetic radiation over said predetermined electromagnetic wavelength range.

17. The calibration pad of claim 1 wherein the pad becomes transparent or translucent upon contact with an aqueous solution.

18. The calibration pad of claim 1 wherein the pad becomes opaque upon contact with an aqueous solution.

19. The calibration pad of claim 1 further comprising one or more fiducial markers for spatial registration useful for imaging.

20. The calibration pad of claim 1 further comprising one or more fiducial markers with a predetermined geometric relationship for spatial registration between image acquisitions.

21. The calibration pad of claim 1 further comprising one or more transferable fiducial marks that are transferred from the calibration pad onto the sample where they remain following removal of the calibration pad.

22. The calibration pad of claim 21 wherein the one or more transferable fiducial marks comprise an ink.

23. The calibration pad of claim 22 wherein the ink is a non-indelible ink.

24. The calibration pad of claim 1 comprising one or more markings on the exterior surface, wherein at least one of the one or more markings has a defined size and shape that allows the determination of least one spatial dimension of acquired hyperspectral images.

25. The calibration pad of claim 1 further comprising a removable interior section, which, upon removal provides optical access to the sample surface.

26. The calibration pad of claim 1 further comprising a portion that can become transparent to the wavelengths of interest.

27. The calibration pad of claim 1 further comprising a portion that can become opaque to the wavelengths of interest.

28. The calibration pad of claim 1 wherein the sterile pad is a two dimensional grid of strips that provide geometric holes to image the subject.

29. The calibration pad of claim 1 wherein the geometric holes are circular or rectangular.

30. The calibration pad of claim 29 wherein the one or more markings on the calibration pad provide a contour suitable for three dimensional stereoscopic referencing.

31. The calibration pad of claim 1 wherein the pad is formed on the sample by spraying.

32. The calibration pad of claim 31 wherein a sheet is placed over the sample before formation of the pad by spraying.

33. The calibration pad of claim 1 wherein the pad is sterile.

34. The calibration pad of claim 1 wherein the wavelength range is selected from the group consisting of 400 to 700 nanometers, 400 to 1100 nanometers, and 400 to 1800 nanometers.

35. A disposable hyperspectral imaging calibration device comprising a reflectance standard having a predetermined reflectance or emission value at a plurality of known wavelengths over a known wavelength range.

36. The device of claim 35 wherein the reflectance or emission value is at least 5 percent.

37. The device of claim 35 wherein the plurality of known wavelengths are selected from the group consisting of visible wavelengths, infrared wavelengths and both visible and infrared wavelengths.

38. The device of claim 35 wherein the known wavelength range is from 400 to 1800 nanometers.

39. A method of calibrating the hyperspectral imaging of a sample, comprising the steps of:

a. placing a disposable hyperspectral imaging calibration pad over the sample;

b. acquiring a hyperspectral image of the calibration pad at two or more wavelengths;

c. determining an intensity variance of a hyperspectral image that includes lighting condition information for each wavelength; and

d. determining an intensity variance of a hyperspectral image that corrects for the shape of the object in the imaging region.

40. The method of claim 39 further comprising a step of determining the spatial dimensions of the acquired hyperspectral image from data obtained with the calibration pad.

41. The method of claim 39 further comprising a step of orienting using one or more fiducial marks in conjunction with calibration information.

42. A method of hyperspectral imaging calibration comprising the steps of:

a. placing a hyperspectral imaging calibration pad over a sample to be imaged;

b. acquiring a hyperspectral image of the hyperspectral imaging calibration pad at a plurality of wavelengths;

c. removing at least a portion of the hyperspectral imaging calibration pad to expose a portion of the underlying sample; and

d. acquiring a hyperspectral image of the remaining disposable hyperspectral imaging calibration pad and the exposed underlying sample at two or more wavelengths.

43. The method of claim 42 wherein the spatial dimensions of the acquired hyperspectral image are determined from information obtained from the calibration pad.

44. The method of claim 42 wherein the three dimensional structure of the sample is determined from information obtained from the calibration pad.

45. The method of claim 42 further comprising the steps of:

e. determining an intensity variance of the hyperspectral image due to the lighting conditions by incorporating the reflectance properties of the reflectance standard at each wavelength;

f. determining an intensity variance of the hyperspectral image due to the shape of the object in the imaging region; and

g. analyzing the hyperspectral image of the sample after removal of the intensity variance of the hyperspectral image due to lighting and shape, thereby inferring one or more properties of the sample.

46. The method of claim 45 wherein the spatial dimensions of the acquired hyperspectral image are determined from information obtained from the calibration pad.

47. The method of claim 45 wherein the three dimensional structure of the sample is determined from information obtained from the calibration pad.

48. A method of hyperspectral imaging calibration comprising the steps of:

a. placing a hyperspectral imaging calibration pad over a sample to be imaged such that a region of interest of the sample is visible through or under the hyperspectral imaging calibration pad at one or more wavelengths of interest;

b. acquiring a hyperspectral image of the hyperspectral imaging calibration pad and of the exposed sample at one or more wavelengths;

c. determining an intensity variance of a hyperspectral image due to lighting conditions by incorporating the reflectance properties of the calibration pad at each wavelength;

d. determining an intensity variance of a hyperspectral image due to the shape of the sample in the imaging region; and

e. analyzing the hyperspectral image of the exposed sample after removal of intensity variance due to lighting and shape, thereby inferring one or more properties of the sample.

49. The method of claim 48 wherein the spatial dimensions of the acquired hyperspectral image are determined from information obtained from the calibration pad.

50. The method of claim 48 wherein the three dimensional structure of the sample is determined from information obtained from the calibration pad.

51. The method of Claim 48 wherein the disposable hyperspectral imaging calibration imaging pad is used to determine the spatial dimensions of the acquired hyperspectral image.

52. The method of Claim 48 wherein the disposable hyperspectral imaging calibration pad is used to determine the three dimensional structure of the sample.

53. The calibration pad of claim 48 wherein the pad has a shape of a rectangle, a circle, a polygon, a triangle, a square, a rectangle or an oval.

54. The calibration pad of claim 48 wherein the pad is a single flat patch against the body part by a fastener, a tensioner, or an internal or external adhesive.

55. A system for obtaining spectral information from the surface of a body part comprising:

a. a calibrator that is form fitting to the body part to assume the shape of that part, and has at least one surface exterior to the body part that reflects light at two or more wavelengths; and

b. a hyperspectral imaging instrument that has a light source and detector capable of detecting a two dimensional image at the two or more wavelengths and which further comprises a computer with a program for calculating an intensity variance as a function of the lighting conditions for a hyperspectral image, using detected reflectance values from the calibration pad at the two or more separate wavelengths.

56. A system for obtaining spectral information from the surface of a body part comprising:

a. a calibrator that is form fitting to the body part to assume the shape of that part, and has at least one surface exterior to the body part that reflects light at two or more wavelengths; and

b. a hyperspectral imaging instrument that has a light source and an imaging-quality wavelength-separation device that can image light at the two or more wavelengths to generate spectral information from the calibrator.

57. The system of claim 56 wherein the imaging-quality wavelength-separation device is a liquid crystal tunable filter or an acousto-optical tunable filter.

58. The system of claim 56 wherein the instrument is a laparoscope or an endoscope.

59. A system for obtaining electromagnetic spectral information from the surface of a sample comprising:

a. a calibrator that is form fitting to the sample to assume the shape of that sample, and has at least one surface exterior to the sample that reflects electromagnetic rays at two or more wavelengths; and

b. a hyperspectral imaging instrument that has a source of electromagnetic rays and an imaging-quality wavelength-separation device that can image reflected electromagnetic rays at the two or more wavelengths to generate spectral information from the calibrator.